MONTANA DIABETES SURVEILLANCE & CLINICAL COMMUNICATION

MONTANA DIABETES PROJECT

Montana Department of Public Health and Human Services
Chronic Disease Prevention and Health Promotion Program
Room C317, Cogswell Building
PO Box 202951
Helena, Montana 59620-2951

ISSUE: APRIL - JUNE 2003

DIABETES IN PREGNANCY – PART II: SELECTED MATERNAL MORBIDITIES AND BIRTH OUTCOMES IN AMERICAN INDIAN AND WHITE WOMEN WITH AND WITHOUT DIABETES FOR TWO TIME-PERIODS, 1989-1994 AND 1995-2000.

WHAT'S INSIDE

BACKGROUND

This report is the second of two surveillance reports about diabetes in pregnancy in Montana using information from birth certificates. Diabetes in pregnancy is one of the most common complications of pregnancy. It is associated with adverse birth outcomes and can complicate delivery. In a previous report we described the increase in diabetes in pregnancy recorded on birth certificates for both white and American Indian mothers in Montana, from 1989 through 2000.[1] This report describes selected trends in maternal risk factors, obstetrical outcomes, and neonatal morbidities in both white and American Indian mothers with and without diabetes coded on the birth certificate.

METHODS:

Birth records from Montana vital statistics for the years 1989 to 2000 were utilized to ascertain live births among women in Montana. Montana residents with a singleton birth were included whether or not women were actually delivered in state or out of state. We excluded births to women who did not actually reside in Montana but who delivered in state. In addition, we excluded a small number of births among state residents whose race was not categorized as American Indian or white (less than 1%).

From 1989 through 1996, Montana birth certificates included a check box to indicate the presence of diabetes. In 1997, the birth certificate was modified to include two check boxes: one for "gestational diabetes" and the other for "pre-existing diabetes". Data for two time periods (1989-1994 and 1995-2000) were compared to assess trends in selected birth outcomes and maternal risk factors in American Indian and white women with and without any form of diabetes listed on the birth certificate.

Data analyses were conducted using SPSS software (Chicago, IL). Birth records were grouped into two six-year time periods to assess trends among American Indian and white women with and without any diabetes. Odds ratios were calculated to assess the association of maternal medical risk factors (hypertension during pregnancy, eclampsia and tobacco use during pregnancy), cesarean section (c-section, primary or repeat), traumatic delivery (use of forceps and/or a vacuum) and the birth weight of the child in American Indian and white women with and without diabetes. Independent T-tests were used to compare mother's age and parity and the child's birth weight between American Indian and white residents during the two time periods.

RESULTS:

From 1989 to 2000, there were 129,020 singleton births recorded among Montana women. During the earlier part of the decade (1989-1994), 2.1% (n = 1,410) of the 66,313 singleton births documented any form of diabetes during pregnancy on the birth certificate. During the latter part of the decade (1995-2000), the number of singleton births decreased to 62,707 and the percentage with any diabetes listed during pregnancy increased to 2.5% (n = 1,573).

Table 1. Maternal and neonatal morbidities in live births, by diabetes status, Montana, 1995 - 2000.

	No Diabetes (N = 61,134)	Diabetes (N = 1,573)
	Mean (SD)	**Mean (SD)**
Age (years)	26.7 (6.1)	29.6 (5.9)*
Parity	1.1 (1.3)	1.4 (1.5)*
Maternal risk factors for pregnancy	**% (n/N)**	**% (n/N)**
Eclampsia*	0.4 (271/61,134)	1.0 (16/1,573)
Tobacco use during pregnancy*	18.2 (11,044/60,698)	20.8 (327/1,570)
Method of delivery		
Cesarean section (primary/repeat)*	17.9 (10,952/61,134)	35.9 (565/1,573)
Birth outcomes		
Birth weight ≥ 4500 grams*	1.5 (912/61,116)	5.5 (87/1,573)
Birth weight ≤ 2500 grams	5.2 (3,160/61,116)	5.8 (92/1,573)
< 37 weeks gestation*	6.8 (4,165/61,000)	14.8 (232/1,570)
Fetal distress*	3.6 (2,205/58,929)	5.1 (81/1,573)
Respiratory distress syndrome*	1.1 (662/61,134)	2.5 (40/1,573)
	Mean (SD)	**Mean (SD)**
Mean birth weight (grams)	3375 (551)	3477 (652)*

*** p-value ≤ 0.05**

From 1995 to 2000, women with any diabetes during pregnancy were significantly older (mean age = 29.6 years) compared to women without diabetes (mean age = 26.7 years) (Table 1). Parity of women with diabetes during pregnancy was also greater (mean parity = 1.4 vs. 1.1, respectively). During 1995-2000, Montana women with diabetes during pregnancy were more likely to have eclampsia documented on the birth certificate, to have used tobacco during pregnancy and had double the c-section rate compared to women without any diabetes (Table 1). Babies born to women with diabetes during pregnancy were significantly more likely to have high birth weight ($\geq$ 4500 grams) (5.5% vs. 1.5%), fetal distress (5.1% vs. 3.6%), respiratory distress syndrome (2.5% vs. 1.1%) and to be delivered at less than 37 weeks gestation (14.8% vs. 6.8%).

Between 1995 and 2000, American Indian mothers with diabetes during pregnancy were slightly younger than white mothers (mean age 28.8 years vs. 29.8 years, $p \leq 0.05$) (Table 2). Similarly, American Indian mothers without diabetes were significantly younger than white mothers (mean age 24.0 years vs. 27.0 years, $p \leq 0.05$). Parity of American Indian mothers, regardless of diabetes status in pregnancy, was significantly greater compared to white mothers (2.0% vs. 1.3% with diabetes and 1.4% vs. 1.0% without diabetes). American Indian women were also more likely to have eclampsia documented on the birth certificate compared to white women, regardless of their diabetes status during pregnancy (OR = 4.9, 95% CI: 1.83-13.23 with diabetes and OR = 3.65, 95% CI: 2.82-4.72 without diabetes). Likewise, American Indian mothers, with and without diabetes in pregnancy, had almost twice the smoking rate as white mothers. American Indian women without diabetes were significantly more likely to give birth to low birth weight babies ($\leq$ 2500 grams) and pre-term babies (< 37 weeks gestation) compared to white women without diabetes (Table 2). Although, white women without diabetes had a slightly higher rate of fetal distress (3.7% vs. 3.1%) and were significantly more likely to have a traumatic delivery (requiring the use of forceps and/or a vacuum) (7.9% and 5.1%, respectively) compared to American Indian women without diabetes.

Average maternal ages remained the same throughout the decade for women of both races and diabetes status (Figure 1). Over time, the percent of women with eclampsia decreased among women with diabetes regardless of their race. However, among those who did not have diabetes in pregnancy, the proportion of women with eclampsia remained relatively constant (Figure 2). Over the two time periods, American Indian women with or without diabetes during pregnancy continue to smoke during their pregnancy at almost double the rate of white women (Figure 3).

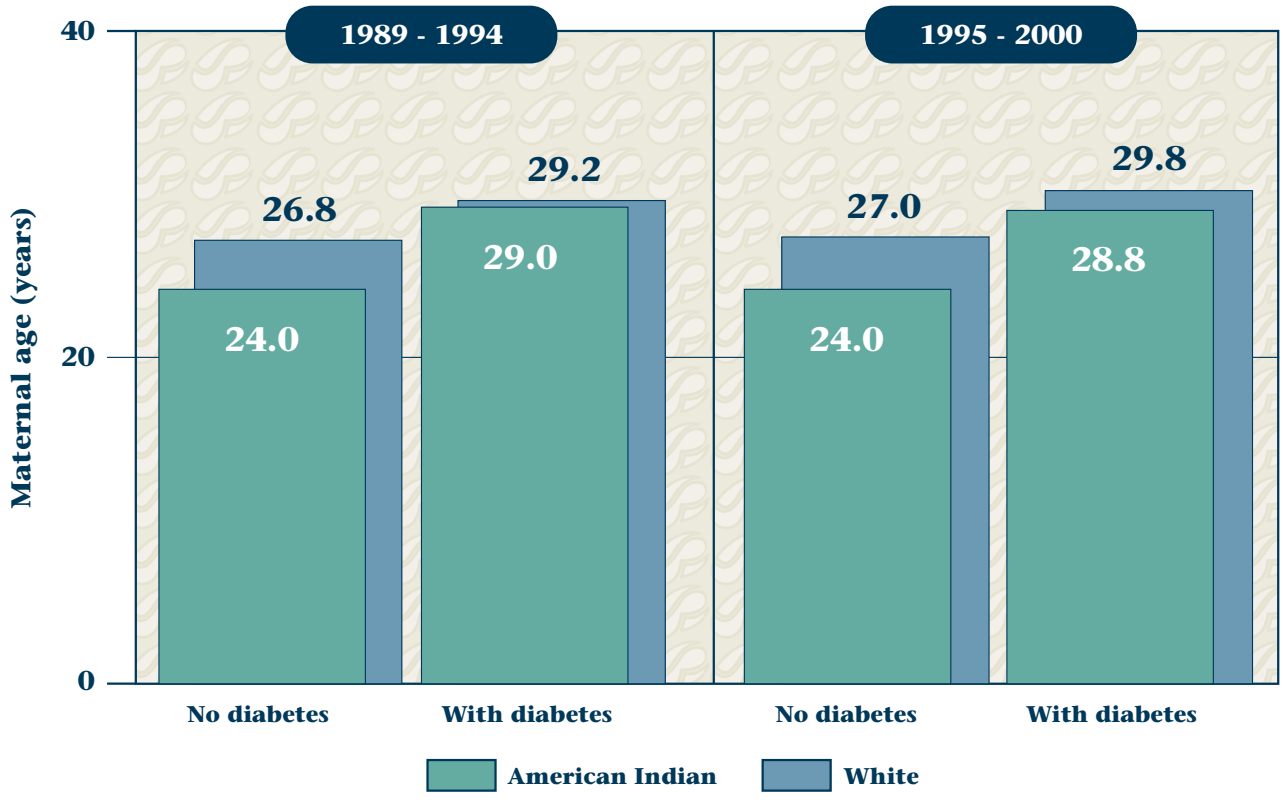
Over the two time periods, American Indian women with or without diabetes during pregnancy continue to smoke during their pregnancy at almost double the rate of white women.

Table 2. Comparison of maternal and neonatal morbidities in live births, by diabetes status and by race, Montana, 1995 - 2000.

	No Diabetes	
	American Indian	White
	Mean (SD)	Mean (SD)
Age (years)	24.0 (5.9)	27.0 (6.0)*
Parity	1.4 (1.5)*	1.0 (1.2)
Maternal risk factors for pregnancy	**% (n/N)**	**% (n/N)**
Eclampsia	1.2 (86/6,968)	0.3 (185/54,116)
Tobacco use during pregnancy	32.7 (2,201/6,739)	16.4 (8,843/53,959)
Method of Delivery		
Cesarean section (primary/repeat)	20.2 (1,409/6,968)	17.6 (9,543/54,166)
Traumatic (forceps and/or vacuum)	5.1 (356/6,968)	7.9 (4,306/54,166)
Birth outcomes	**Mean (SD)**	**Mean (SD)**
Birth weight (grams)	3436 (616)*	3367 (542)
	% (n/N)	% (n/N)
Birth weight ≥ 4500 grams	2.7 (189/6,961)	1.3 (723/54,155)
Birth weight ≤ 2500 grams	5.9 (412/6,961)	5.1 (2,748/54,155)
< 37 weeks gestation	8.6 (598/6,943)	6.6 (3,567/54,057)
Fetal distress	3.1 (218/6,968)	3.7 (1,987/54,166)
Respiratory distress syndrome	1.2 (87/6,968)	1.1 (575/54,166)

*** p-value ≤ 0.05**

Figure 1. Maternal age of Montana American Indian and white women with and without diabetes during pregnancy, 1989-2000.



		Diabetes	
	American Indian	White	
	Mean (SD)	Mean (SD)	
	28.8 (6.2)	29.8 (5.9)*	
	2.0 (1.7) *	1.3 (1.4)	
OR (95% CI)	% (n/N)	% (n/N)	OR (95% CI)
3.65 (2.82-4.72)*	3.0 (8/271)	0.6 (8/1,302)	4.92 (1.83-13.23)*
2.47 (2.34-2.62)*	31.1 (84/270)	18.7 (243/1,300)	1.96 (1.47-2.63)*
1.19 (1.11-1.26)*	42.8 (116/271)	34.5 (449/1,302)	1.42 (1.09-1.86)*
0.62 (0.56-0.70)*	5.2 (14/271)	6.9 (90/1,302)	0.73 (0.41-1.31)
	Mean (SD)	Mean (SD)	
	3711 (727)*	3428 (624)	
OR (95% CI)	% (n/N)	% (n/N)	OR (95% CI)
2.06 (1.75-2.43)*	14.4 (39/271)	3.7 (48/1,302)	4.39 (2.81-6.85)*
1.18 (1.06-1.31)*	5.5 (15/271)	5.9 (77/1,302)	0.93 (0.53-1.65)
1.33 (1.22-1.46)*	18.1 (49/271)	14.1 (183/1,299)	1.35 (0.95-1.90)
0.85 (0.74-0.98)*	4.4 (12/271)	5.3 (69/1,302)	0.83 (0.44-1.55)
1.18 (0.94-1.48)	2.2 (6/271)	2.6 (34/1,302)	0.84 (0.35-2.03)

Figure 2. Among American Indian and white women with and without diabetes during pregnancy the percent with eclampsia, Montana, 1989-2000.

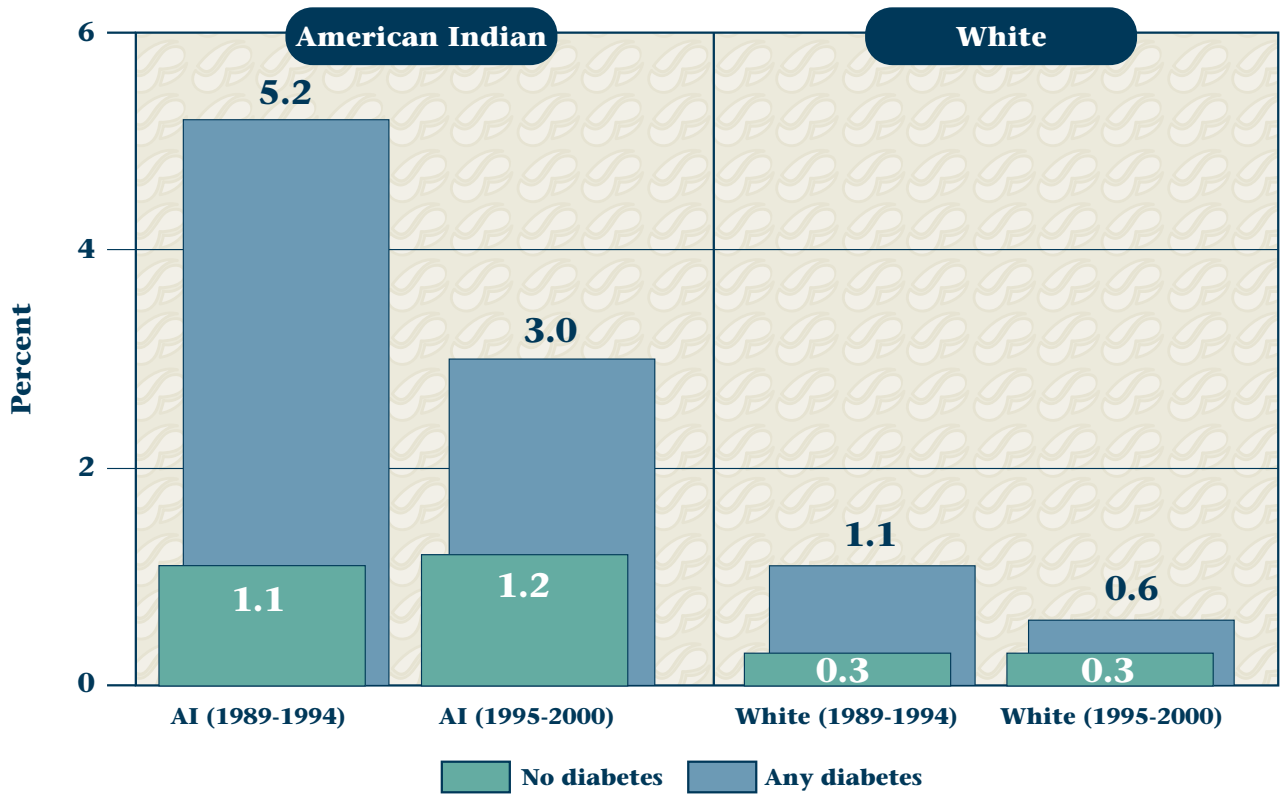


Figure 3. Among American Indian and white women with and without diabetes during pregnancy the percent with tobacco use, Montana, 1989-2000.

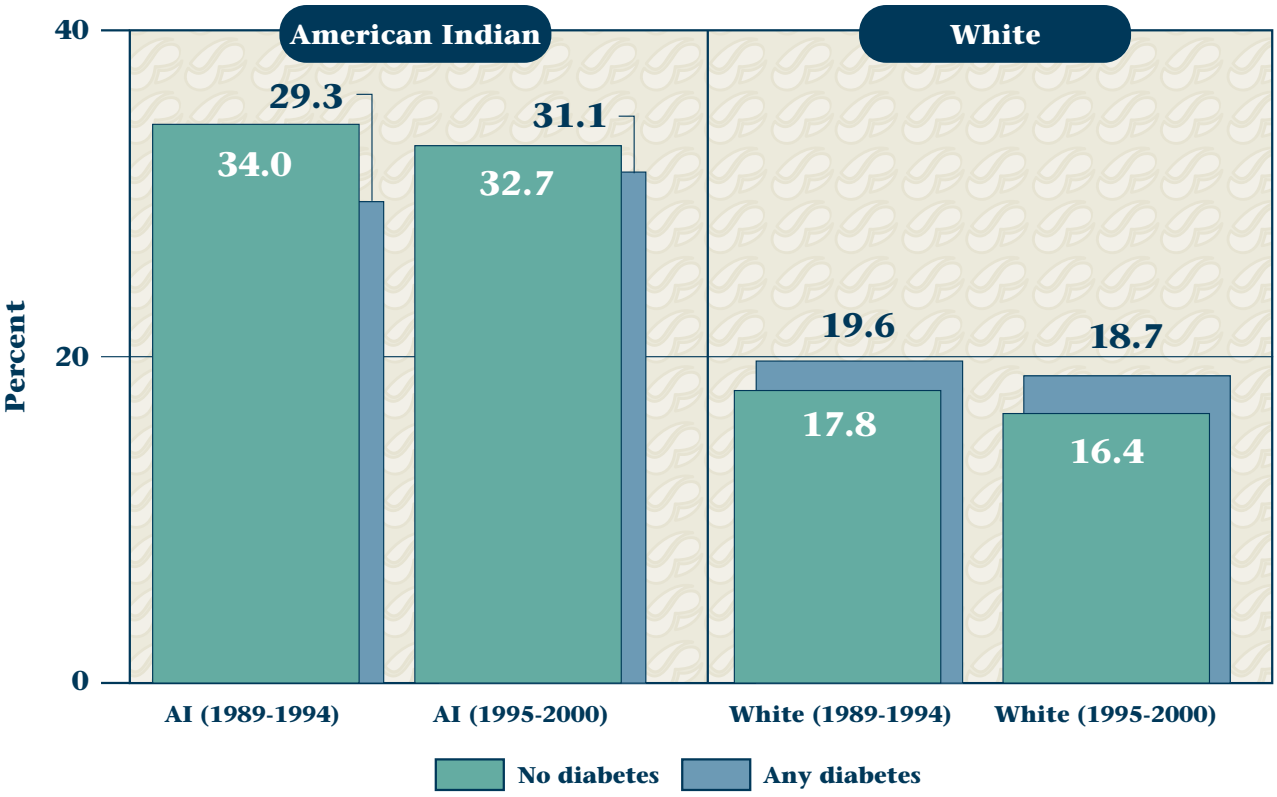
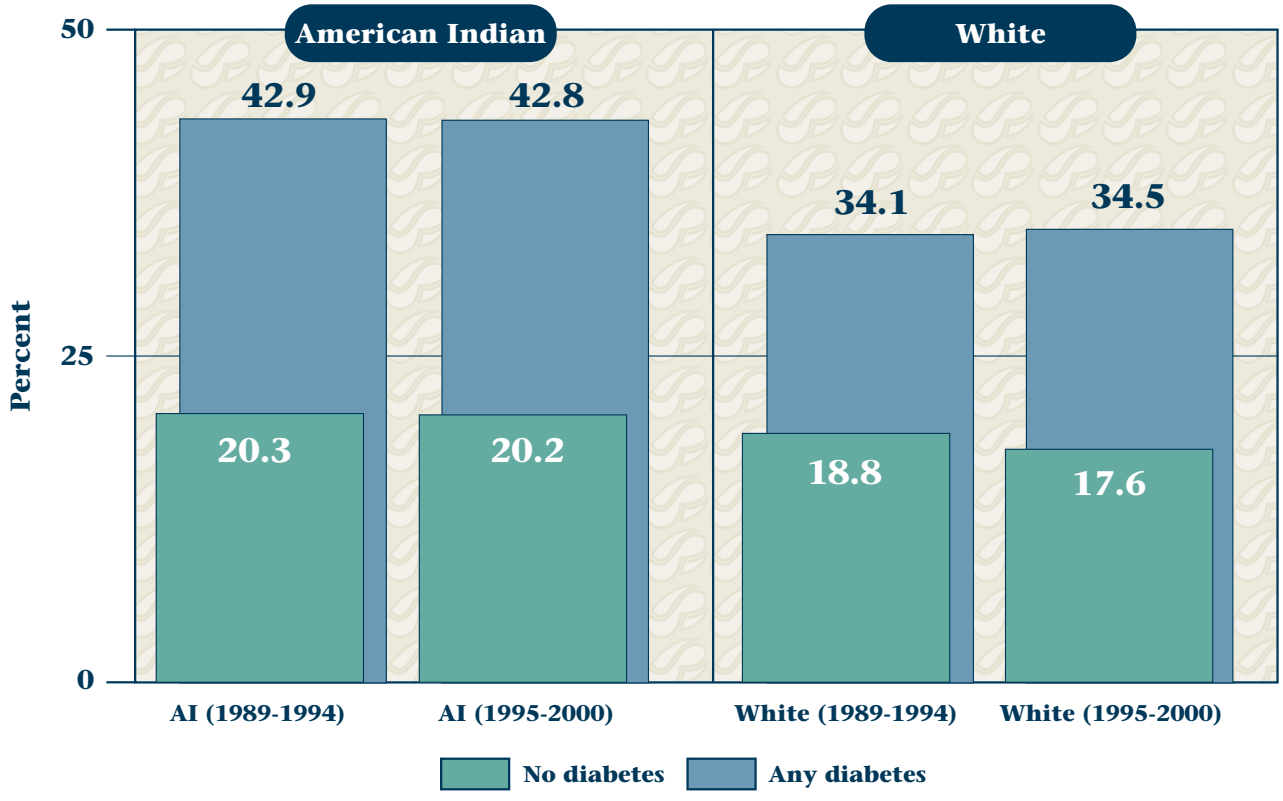


Figure 4. Among American Indian and white women with and without diabetes during pregnancy the percent with cesarean sections, Montana, 1989-2000.



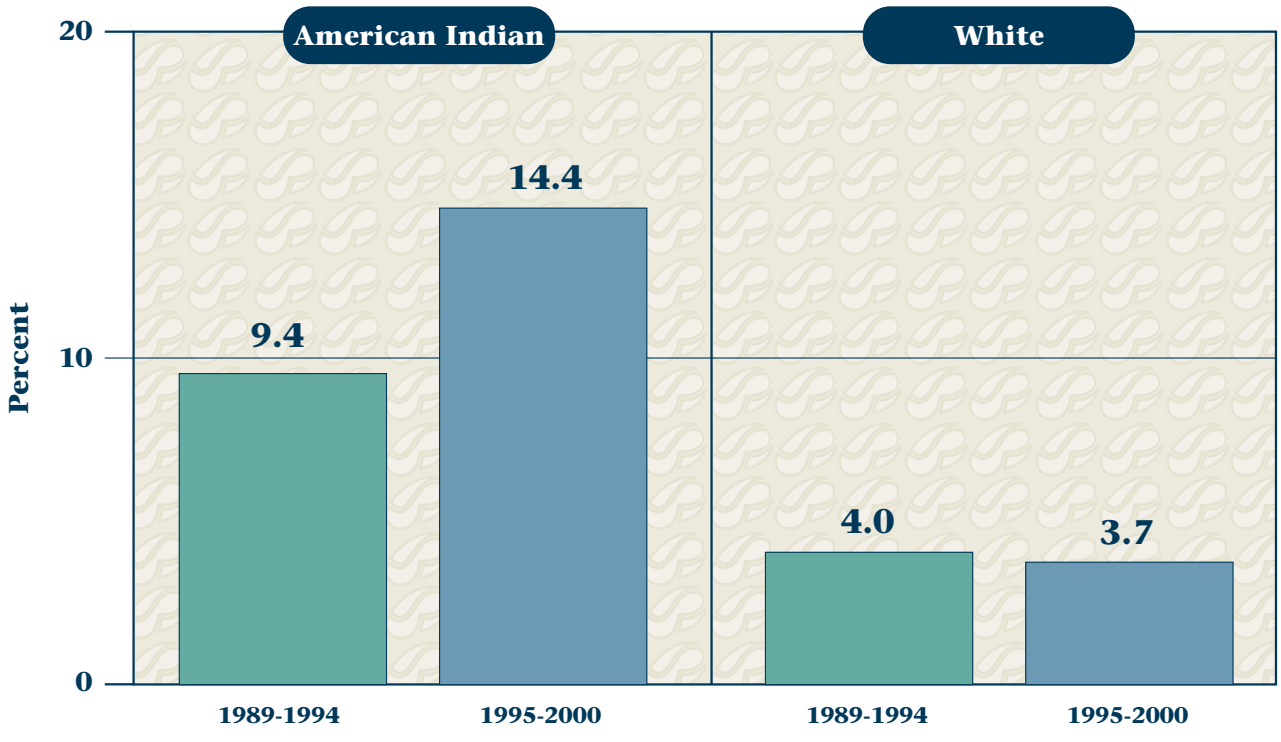
Overall, in Montana, American Indian women were more likely to have a c-section compared to white women regardless of their diabetes status during pregnancy, and the percentages have not changed from the first part of the decade (Figure 4).

Montana American Indian women, with or without any diabetes during pregnancy, had significantly higher rates of macrosomia (birth weight ≥ 4,500 grams) (14.4 % and 2.7% respectively) compared to white women (3.7% and 1.3%, respectively). Figure 5 illustrates the dramatic increase in macrosomia among American Indian women with diabetes during pregnancy. The percentage of babies with birth weight over 4,500 grams increased from 9.4% in the early part of the decade (1989-1994) to 14.4% in the latter part of the decade (1995-2000).

Montana American Indian women, with or without any diabetes during pregnancy, had significantly higher rates of macrosomia compared to white women.

Among white women with any diabetes in pregnancy, the percentage of babies with macrosomia decreased slightly from 4.0% (1989-1994) to 3.7% (1995-2000).

Figure 5. Among American Indian and white women with and without diabetes during pregnancy the percent with high birth weight (≥ 4500 grams) babies, Montana, 1989-2000.



DISCUSSION:

Diabetes in pregnancy has increased among American Indian and white women from 1989 to 2000 in Montana.[1] With this increase, there appears to be little change in the proportion of c-sections and tobacco use during pregnancy among women of either race (American Indian and white) and diabetes status. However, the proportion of high birth weight (≥ 4,500 grams) babies among American Indian women with diabetes has dramatically increased to over 14%.

Women with any diabetes in pregnancy continue to have double the c-section rate of women without diabetes. In particular, American Indian women with any diabetes have maintained c-section rates exceeding 40% for the two time-periods.

The data about rates of smoking during pregnancy among American Indian women in Montana are of particular concern. Nationally, rates of smoking during pregnancy declined modestly in most racial and ethnic groups in the US.[2] In 2000, the proportion of American Indian women smoking in pregnancy in the U.S. was 20%.[2] In Montana, the rate of smoking in pregnancy in American Indian women was 1.5 times higher than this. And almost one third of American Indian women with diabetes during pregnancy continued to smoke.

Finally, in Montana, American Indian and white women with any form of diabetes during pregnancy continue to give birth to babies with high birth weight (≥ 4,500 grams). Disturbingly, for American Indian women with diabetes in pregnancy there was an increase in high birth weight babies from the earlier part of the decade (9.4%) to the latter part of the decade (14.4%), but this increase did not reach statistical significance. Thus, there is a need to continue on-going surveillance of women with diabetes pre-pregnancy, during pregnancy and post partum to understand and document the success of interventions to minimize the morbidities associated with diabetes in pregnancy.

In Montana, American Indian and white women with any form of diabetes during pregnancy continue to give birth to babies with high birth weight.

REFERENCES:

1. Gohdes D, Harwell TS, Helgerson SD, et. al. Increasing rate of diabetes in pregnancy among American Indian and white mothers in Montana, 1989-2000. Montana Diabetes Surveillance & Clinical Communication;January-March 2003, pages 1-6.

2. Martin JA, Hamilton BE, Ventura SJ, Menacker F, Park MM. Births: Final Data for 2000. National Vital Statistics Reports, Vol. 51, No. 2. Hyattsville, Maryland: National Center for Health Statistics, February 12, 2002.

Reported by: CS Oser, TS Harwell, SD Helgerson, D Gohdes, Montana DPHHS

UPCOMING CONFERENCES FOR HEALTH PROFESSIONALS AND PATIENTS/FAMILIES

OCTOBER 10 - 11, 2003

The 2003 annual health care professional conference titled, "**Current Clinical Concerns in Diabetes Management in Montana**" will be held October 10-11 at the Best Western Heritage Inn, Great Falls. Nationally recognized faculty will present, including Diane M. Karl, M.D., Portland, OR; Larry C. Deeb, M.D., Tallahassee, FL; Stephen J. Rith-Najarian, M.D., Bemidji, MN; Renae Bradley, RN, MSN, ARN, CDE, Minneapolis, MN; and David Jackson, M.D., Billings, MT. Topics this year will include clinical management of type 1 and type 2 diabetes in youth; managing the whole spectrum of diabetes in childbearing women: primary care and perinatology in partnership; preventing foot complications among patients with diabetes; and advancing anti-hyperglycemic therapies to improve metabolic control in type 2 diabetes – when and how to incorporate insulin. A workshop is planned for October 10 titled, "Diabetes Documentation – What's new in 2003?" that will focus on applying current coding and billing guidelines for diabetes outpatient care and self-management education. Continuing education credits and CME will be available for physicians, pharmacists, nurses and dietitians. Register by October 3 by calling the University of Montana Conferences and Institutes at 406-243-2094. For conference content information, contact the Montana Diabetes Project at 406-444-6677.

OCTOBER 10, 2003

On Friday, October 10th, the Montana Chapter of the American Association of Diabetes Educators is sponsoring three presentations at the Heritage Inn in Great Falls.

This will include Mary Jo Dudley, RN, BSN, CDE, who is the national diabetes educator of the year. Ms. Dudley will present on "The role of the diabetes educator in preventing diabetes" and "Gestational diabetes and the all important follow-up." Additionally, Ross Tanner, MD, will be presenting on "Smart Steps: Getting to goal in type 2 diabetes." For more information please contact the Montana Diabetes Project at 406-444-6677.

NOVEMBER 1 & 15, 2003

The American Diabetes Association will be having their annual Diabetes EXPOs for persons living with diabetes and their family members. These events are great opportunities for people with diabetes and their families to learn the latest on diabetes management! The EXPOs will be held in Missoula on Saturday, November 1st, and in Billings on Saturday, November 15th. The EXPO costs $5 per Person or $8 for two adult family members and children under 18 free with an adult. To register or for more information visit, call, or e-mail the ADA at 3203 3rd Avenue North, Suite 203, Billings, Montana 59101, 1-800-766-8596 or 406-256-0616, tcullinan@diabetes.org.

NEWLY RECOGNIZED DIABETES EDUCATION PROGRAMS

The following list includes those diabetes education programs that have recently achieved provisional recognition from the Indian Health Service. They have met the high standards for quality required, and deserve our congratulations!

- Rocky Boy Diabetes Program

WHAT IS THE MONTANA DIABETES PROJECT AND HOW CAN WE BE CONTACTED:

The Montana Diabetes Project is funded through a cooperative agreement with the Centers for Disease Control and Prevention, Division of Diabetes Translation (U32/CCU815663-05). The mission of the Diabetes Project is to reduce the burden of diabetes and its complications among Montanans. Our web page can be accessed at http://ahec.msu.montana.edu/diabetes/default.htm.

For further information please contact us at:

Project Coordinator:
Todd Harwell, MPH
Phone 406/444-1437
Fax 406/444-7465
e-mail tharwell@state.mt.us

Education Coordinator:
Marcene Butcher, RD, CDE
Phone 406/444-6677
e-mail marcibutcher@msn.com

Cardiovascular and Diabetes Epidemiologist
Carrie Oser, MPH
406-444-4002
e-mail coser@state.mt.us

Quality Improvement Coordinator:
Janet McDowall, RN
Phone 406/248-1270
e-mail jmcdowall@state.mt.us

Project Assistant:
Susan Day
Phone 406/444-6677
e-mail sday@state.mt.us

Quality Improvement Coordinator:
Elizabeth "Liz" Johnson, RN, CNP
Phone 406/449-2168
e-mail lizj@state.mt.us

MONTANA DIABETES SURVEILLANCE & CLINICAL COMMUNICATION

MONTANA DIABETES PROJECT

Montana Department of Public Health and Human Services
Chronic Disease Prevention and Health Promotion Program
Room C317, Cogswell Building
PO Box 202951
Helena, Montana 59620-2951